Implications of long-term oscillations in rainfall extremes on urban drainage design practices

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Should the Urban Rational Method Continue to Be Used in Australia?

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Abstract
The urban Rational Formula method has been recommended in Australia for small urban drainage design projects since 1958. In the 21st century, computer-based modelling has almost totally supplanted the role of hand calculations in urban drainage design. Notwithstanding these advances, some authorities still require urban hydrological models to be 'calibrated' to match peak flows estimated using the urban Rational Method.

It is paradoxical that at a point in time when we can now extract the maximum out of existing data collected over the past 40 years in a number of gauged urban catchments to recommend more factual parameters for the Rational Method, it is also the time to consider whether there is any merit in continuing to use the Rational Method for urban drainage system analysis or design. At the same time, the need for further urban gauged data is as important as ever whether the Rational Formula continues to be used or not.

Notwithstanding the preliminary assessment of gauged urban catchments in Sydney, Melbourne and Darwin disclosed that in general the 1977 ARR Rational Method gives peak flows which better match the peak flows calculated by flood frequency analysis than the peak flows estimated using the 1987 ARR Rational Method. It is concluded that without carrying out further studies on a significant number of additional gauged urban catchments the continued use of the Rational Method for urban drainage analysis and design can no longer be justified in Australia.

Keywords
Rational method, gauged urban catchment, runoff coefficient, time of concentration

2518291

Implications of Long-Term Oscillations in Rainfall Extremes on Urban Drainage Design Practices

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Abstract
In the last decade damaging floods have affected many European and major Danish cities including Copenhagen. As a result, the concept of integrated resilient water management came in the political agenda for developing climate adaptation plans required for all Danish municipalities. An emerging area within the climate change debate addresses the quantification of natural climatic variations. Recent studies have shown profound multi-decadal oscillations in extreme rainfall over Europe including Denmark. The present study focuses specifically on the variation of historical design values for urban drainage design in Denmark. It showed that historical design values exhibit a similar pattern of variation. The analysis also covered Danish and European legislation on water management, concluding that the main directives on protection of the aquatic environment were adopted during periods of few extreme events. This illustrates the importance of the natural variation as a driver for the development of urban design practice and ranks it alongside technological and scientific advances. Therefore it is highly relevant to incorporate the knowledge of the natural variation in the resilient water management concept and future research strategies.

Keywords
Extreme rainfall, natural variability, multi-decadal oscillations, urban drainage design

2518476

Road Map for Delivery of Sustainable Drainage Systems in the UK

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Abstract
With growing expectations from the customers, changes in the regulatory framework for water companies have been considered. A new focus on 'outcomes' of service provision and increasing requirements to consider resilience, climate change and sustainability has been summarised. Many UK sewerage undertakers have begun to give the role of sustainable drainage systems (SuDS) greater consideration. However, UK based knowledge, limited experience of SuDS use and the risks (perceived or real) of using these systems are inhibiting their uptake. Consequently, UK water industry research (UKWIR) commissioned a study led by the Construction Industry Research and Information Association (CIRIA) to develop a review of SuDS use and applicability in a 'State-of-the Nation' report and consult with industry to develop a SuDS research roadmap.

Keywords
Urban drainage, SuDS, water industry, assets, roadmap, research, state-of-nation, scenarios

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How Relevant is Climate Change for Sewer System Design? A Tentative Projection Based on the Past 30-Year Review

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